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AF/CP 3652  
#15

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Alvin L. Neeley ) ArtUnit: 3652  
Serial No. 09/440,149 ) Examiner: Underwood, D.  
Filed: November 15, 1999 )  
For: MANHOLE COVER LIFTING ) Attorney  
APPARATUS AND METHOD ) Ref. No.: P112554

RECEIVED

SEP 24

**CERTIFICATE OF MAILING (37 CFR 1.8a)**

The Honorable Commissioner  
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**APPEAL BRIEF**

The Notice of Appeal was filed on this May 10, 2001. The Appellant's Appeal Brief was due this July 10, 2001. A two-month extension of time is hereby requested to make the present Appeal Brief due on September 10, 2001. A check in the amount of \$195.00 is enclosed in payment of the extension fee. A check in the amount of \$155.00 is enclosed in payment of the fee for filing the Brief in support of the Appeal. It is believed that no other fee is due at this time to maintain the application in full force and effect, but if any such fee is due, please charge this to account no. 08-3260.

I. Party in Interest.

The sole owners of this patent application are the applicants, namely, Mr. Alvin L. Neeley and Mr. Steven M. Davis.

II. Related Appeals and Interferences.

09/21/2001 CNGUYEN 00000019 09440149

01 FC:220 155.00 OP  
02 FC:216 195.00 OP

The applicants are unaware of any other appeals or interferences that would have any effect or have any bearing on the board's decision in this appeal.

### III. Status of the Claims.

The claims presently on Appeal are claims 1, 3-9 and 13. The rest of the claims have been withdrawn from consideration except for claims 10 and 21. Claim 10 was objected to as depending from a non-allowed claim, but was indicated as having allowable subject matter. Claim 21 is a new independent claim which contains the same subject matter as claim 10, and has been allowed. Accordingly, the Applicant's attorney intends to cancel claim 10 at such time as the application is returned to the Examiner for further handling.

The present application was filed as a continuing prosecution application on November 15, 2000, and this was filed with a preliminary amendment amending claim 1, canceling claim 2, making some minor amendments, and adding a new independent claim 21.

On February 12, 2001, a final rejection was issued. In that action, claims 11, 12, and 14 – 20 were withdrawn from consideration. Claim 21 was allowed. Claims 1, 3 – 9, and 13 were rejected on the basis of prior art. Claim 10 was objected to as being dependent upon a rejected claim. Accordingly, claims 1, 3 – 9, and 13 are currently under appeal.

### IV. Status of Amendments.

No amendments have been filed subsequent to the final rejection.

### V. Summary of the Invention.

The present invention relates to a lifting assembly 10 (page 9, line 15) to lift an object such as a manhole cover 12 (page 13, line 17) that comprises a

beam structure (the lifting bar 20) (page 9, line 26) with a pivot end 24 (page 9, line 32) and a mobile end 26 (page 9, line 32).

There is a pivot support (the post 28) (page 10, line 5) connected to the beam structure 20 at the pivot end at a substantially stationary base surface pivot location (at the lower engaging end 32) (page 10, line 32). There is the mobile support member 34 (page 10, line 27) having a mobile base surface engaging portion (the ground engaging wheels 40) (page 10, line 31).

The lifting mechanism 18 (page 9, line 25) is mounted to the beam structure (the lifting bar 20) between the pivot support 28 and the mobile support 34. Further, this comprises a lift connection (lift attachment 62--page 12, line 27) and an actuator (the lifting mechanism 18 which in turn comprises the actuating rod 64 and the actuating crank 66) (page 12, lines 29 and 30).

Thus, the lifting assembly can be positioned over the object (the manhole cover) with a pivot support 28 being on one side of the manhole cover 12 and the mobile support 34 comprising the wheels 40 being on the opposite side of the manhole cover. The lifting mechanism 18 is able to raise the manhole cover 12, and the mobile support 34 can be moved laterally to move the manhole cover 12 away from the manhole opening.

The mode of operation of the present invention can easily be seen from viewing figures 1, 2A-C, and claims 3A-B. The assembly 10 is placed over the manhole cover 12 with the pivot post 28 on one side of the manhole cover 12 and the mobile wheeled member 34-40 being on the opposite side of the manhole member 12. The connector 62 is inserted through the manhole opening and the connection is made (see Fig. 2A). Then the crank handle 66 is rotated to move the manhole cover 12 upwardly (see Figs. 2B and 2C). Then the mobile end of the tool is pulled laterally to move the manhole cover from the position of Fig. 3A to the position of Fig. 3B. To replace the manhole cover 12, the reverse operation follows (i.e. moving a manhole cover 12 back over the manhole, and then lowering the manhole cover 12).

The main benefits of the present invention in alleviating the back injuries is that the workman needs only to rotate the crank 66 to raise the manhole cover,

and then from an upright position attach a T-hook or a line to the mobile end of the bar and pull sideways from an upright position.

#### VI. Issues.

The issues are the following:

- A) Whether claims 1, 3, 4, 7-9, and 13 should be rejected under 35 USC 103(a) as being unpatentable over British reference 2,111,013 in view of Bean;
- B) Whether claim 5 should be rejected under 35 USC 103(a) as being unpatentable over British reference 2,111,017 in view of Bean and further in view of Schaller;
- C) Whether claim 6 should be rejected under 35 USC 103(a) as being unpatentable over British reference 2,111,017 in view of Bean and further in view of Larsen;
- D) Whether claims 1-9 and 13 should be rejected under 35 USC 103(a) as being unpatentable over British reference 2,111,017 in view of Schaller.

#### VII. Grouping of the Claims.

Claims 1-3 comprise one group of claims which should rise or fall together.

Claims 4 and 5 are a second group of claims which should be considered together.

Claim 6 should stand by itself, and the prior art simply does not show this element.

Claims 7-9 stand as a group.

Claim 13 stands by itself, in that it provides a particular environment in which the invention should be viewed.

#### VIII. Arguments

1. The Problem Solved By The Present Invention.

The problem is the high number of back injuries occurring in the electric utility industry (and other related industries, such as water supply, sewer systems, etc.) that result from the present system of removing and replacing manhole covers (also called "vault covers"). The present commonly used method is primarily a manual operation, using handheld tools by which the workers use physical lifting force. While there have been attempts in the past several decades to provide an acceptable tool to remove and replace the manhole cover mechanically, the present injury-prone method still predominates.

a) Introductory comments.

- i. Probably the easiest way for the reader to get a "hands on" understanding is to review the four-page declaration of Mr. Ed Mecum, a Seattle City Light employee for the last 29 years. For the convenience of the reader, certain excerpts are printed below from Mr. Mecum's Declaration, these being indicated by the page and line location:

- ii. Getting to the Job Site

This is discussed in page 1, section 2, of Mr. Macem's declaration as follows:

"In Seattle City Light there are commonly three men on such a crew. In a normal day's work, the three people in the crew would ride in a van to one or more job sites where there is a vault, with most of these being an underground vault with a vault cover or lid. Our van would be a little bit smaller than a UPS truck and would be loaded so that the total load with various equipment, such as splicing equipment,

ladders, safety equipment, etc., generally takes up most all of the room in the truck. At the job site the helper would normally set up the metal barriers and fences around the manhole cover (vault lid). The manhole cover would be removed from its position covering the vault opening, and then one or more of the workmen would go downwardly through the vault into the vault area to perform the work."

b) The Method of Removing the Manhole Cover (i.e. the Vault Lid)

This is described in section 3, Mr. Macem's declaration as follows:

"Quite often, the manhole covers are located on a roadway (generally paved roadway) and a typical manhole cover could be about 42" in diameter and weigh 400 pounds or possibly less for a smaller vault lid. One typical way of lifting a manhole cover from its closing position is to connect a city hook to the sides of the manhole cover. This city hook has an end hooking member and a rod or bar about  $\frac{3}{4}$ " in diameter and about 2  $\frac{1}{2}$  feet long. At the top of the bar there is a cross handle (so that the bar and the handle has an overall T-shape). One man would be on one side of the manhole cover and one on the other, and both would lift on the T-bar to lift the cover out of the vault opening. The two men raise the manhole cover about two inches above the surrounding street surface and then move the manhole cover sideways to let it rest on the surface."

Page 2, section 4

"In some instances, the manhole cover is "stuck" in the opening. This could happen, for example, when the street has been paved or re-paved and the paving material has worked in around the edges of the manhole cover. When

this happens, it is common for the worker to use a sledgehammer and beat on the manhole cover until it is loose. Then the same lifting operation is employed.”

2. How Long Has The Currently Used Method Of Removing And Replacing Manhole Covers Been In Existence?

Mr. Macem has been employed by Seattle City Light since 1972 and states that the same method of using manual tools has been in existence since then, and probably long before that. More specifically, in section 5 of his declaration he states the following:

“This general system of lifting the manhole covers has been used by Seattle City Light ever since I began working there, and to the best of my knowledge this is generally the same system that is used throughout the industry. ... Again, to the best of my knowledge, these have been in existence when underground electrical distribution networks have been used, and these have been in existence for about the last 90 years.”

3. What Other Methods Have Been Tried?

a) On page 3, section 6, Mr. Macem states the following:

“Other methods have been tried, such as attaching a fulcrum or other member to a lid to the manhole cover and providing some sort of handle for lifting it. However, to the best of my knowledge, a manual operation where the worker lifts the manhole cover above the hole by pulling upwardly on a handle or other device remains the commonly used method of removing manhole covers. With a 400-pound lid, the two workmen would each be exerting an upward pull of about



200 pounds (somewhat more if the lid is stuck in some manner)."

- b) The attached declaration of Mr. Davis, one of the co-inventors, states the following:

"Due to the substantial physical challenges of manually lifting and handling vault lids using those methods, various automated or semi-automated mechanical lifting devices devised, such as truck lift using the power of the truck and a Lanyard, a Quinn Roller Block which is a leverage device, or any other leverage bar device having been designed and integrated in utility work. However, these have not been widely accepted due to awkwardness and/or inability to be consistently used in all situations, and vault lid removal is still predominantly manually performed."

4. The Physical Effects Of Repeatedly Lifting Vault Lids With The Existing Manual Method.

This is discussed in Mr. Davis' Declaration on page 4, section 7.

In section 7 of his declaration, Mr. Davis discusses the resulting back injuries. It should be noted that Mr. Davis has a strong academic background in this particular technology (see section 2 of his declaration giving his credentials), and has studied this problem for a number of years.

"In general, on a statistical basis, a large percentage of occupational injuries resulting from physically demanding work are strain/sprain type back injuries. These commonly occur when a person is performing a lifting motion, and particularly when the lifting movement involves not just a

straightforward lifting motion with a relatively safe load, but where the lifting motion is accompanied by the person being in an unbalanced position, and/or conducting the lifting motion where there are lateral or twisting forces coupled with high lifting and pulling forces. I have analyzed the biomechanics of lifting when workmen manually remove and replace vault covers, and I find the following:

- i. the lifting of vault lids can require an awkward unbalanced stance;
- ii. excessive forward bending (awkward lifting postures) coupled with extreme lifting requirements increases spinal disc pressures particularly at L4-L5. These lifting demands require high force output from the back musculature including the erector spinae muscles, which are more endurance muscles than power muscles. These demands often far exceed maximal permissible load limits and recommended load limits for the back;
- iii. frequent unstable footing when lifting, pulling and dragging vault lids.

Continually performing this type of physically demanding work significantly increases the likelihood of a serious cumulative work related musculoskeletal disorder (WMSD) affecting the back and/or other musculoskeletal joints including the knees, shoulders, etc. In general, even if the best and safest lifting postures and techniques are assumed when lifting vault lids, the physical requirements and absolute demands significantly increases the risk for severe injuries."

Then we also have the comments provided by Mr. Macem that appear on page 4, section 10 of his declaration. These are as follows:

“Mr. Hughes has also asked me to comment in my statement that this could drastically reduce the risk of back injuries. While I can't give hard statistics on this, on the basis of my experience in my jobs for Seattle City Light, at least half of people on the crew (probably a lot more) have some sort of back problems. The lifting and removal of vault lids is one of the jobs that probably places as much strain on the person's back as any other job that we do. Quite often a person on the crew (particularly a younger person) will take the lifting of the vault cover as a physical challenge and do the lifting in the usual way. However, after a person has sustained a back injury, if he can be provided with a tool that would reduce the odds of re-injuring the back, this tool would be a real help.”

5. The Basic Structure And Operation Of The Present Invention.

This is immediately understandable by viewing the following figures:

- i. Fig. 1 shows the entire apparatus in its position, ready to lift the manhole lid (vault cover).
- ii. Fig.'s 2A – 2B show the sequence of lifting the vault lid upwardly.
- iii. Fig.'s 3A & 3B show a top plan view, showing the vault lid 12 being moved off to one side from the manhole cover 14.

There are several significant things to note in the operation of this apparatus, namely:

- a) The lifting force is done mechanically, and in this preferred embodiment is accomplished by a lifting jack (specifically comprising a hand crank).

A person using only four to eleven pounds of hand-arm force could accomplish a 900-pound lift. If the lifting force needs to exceed 900 pounds, a ratchet device could be used along with the lifting tool.

- b) To move the manhole cover laterally, the workman could roll the manhole cover laterally while remaining in an upright position, simply by taking a T-bar hook and move the hook to engage an eyebolt 51 and pull this laterally while the workman is a more upright position.
- c) Since the pivot post 28 remains at a substantially fixed position, it makes it very simple to replace a manhole cover simply by moving the mobile end (i.e. where the wheels 40 are located) back to its original location shown in Fig. 3A, and then use the jack to lower the manhole cover into place.

7. The Present Invention Alleviates (or Substantially Eliminates) the Risk of Back Injury.

In section 8 (page 5) of the declaration of Mr. Davis, he summarizes the benefits of the invention as follows:

"I have performed a similar analysis relating to the physical motion of the workmen in utilizing the present application. When using the vault lid lifting tool, which is shown and claimed in the present invention, the risk for cumulative types of musculoskeletal injuries is virtually eliminated. There is no awkward lifting, dragging the vault lid or excessive force requirements. The tool is easily and efficiently operated so that when the person is exerting any force, he is standing in a fully upright position. The lid is easily lifted using a hand crank or screw gun coupled with a lifting jack affixed to a horizontal frame over the lid. The lid is lifted quickly using 4-11 pounds of hand arm force for up to a 900 pound lift. A ratchet device can be used along with the tool if lifting force exceeds 900

pounds. Because the person can operate the tool in an upright position and hand/arm force requirements are minimal, footing is always stable. Once the lid is lifted using this tool, the lid is rolled out of the way (one hundred and eighty degrees) to access the underground vault. This can also be accomplished with the person being in an upright position. When done, the tool is rolled one hundred eighty degrees back to its original spot and the lid is replaced directly into the vault access hole. No lifting or dragging is required in either case."

7. Solving The Problem Of The Reluctance Of Workers In The Electric Utilities Industry From Accepting The Prior Art Solutions. (The "User-Friendly" Aspects Of The Present Invention).

One of the puzzling problems is that some sort of power-driven lifting device has not become widely used in the removal and replacement of manhole covers. This was discussed by the applicant's attorney with Mr. Macem who has had 29 years' experience in this industry. Mr. Macem had used the tool of the present invention on a trial basis in 1994, and his memorandum report to Mr. Davis, one of the co-inventors, is attached to Mr. Macem's declaration. Mr. Macem's report was very positive. Further, he made some recommendations that the tool should be mounted on the rear end of the truck so that it would be easily available and would encourage a crew to use it. He also states that mounting a tool in a handy location would encourage its constant use and make it more user-friendly as a crew becomes accustomed to it. The applicant's attorney, the undersigned, questioned Mr. Macem further on this, and enclosed were the following comments from his attached declaration:

"I have also been asked by Mr. Hughes to comment on the statement which I had made that mounting this tool in a handy

location would encourage its constant use and make it more user friendly as the crew becomes accustomed to it. To explain this further, if there are inconveniences or time delays in trying to get a piece of equipment set up, or if it is awkward to handle, the person on the crew is likely not going to take the trouble to use it but simply go back to the tried and true way of using the hook, even though it does put strain on the person's back. Also, the equipment has to be easily accessible. This is why I suggested in my letter that the main part of the tool could be mounted to the front exterior of the truck and the miscellaneous pieces be placed in a small box attached to the inside of the rear door. This tool can be set up very quickly, and it is very simple to use. Further, there is the convenience that after the tool is used to move the vault lid off to the side, then the replacement becomes very easy since its just the reverse operation of moving the tool about a pivot point back over the vault lid opening."

8. Why The Present Invention Is Unobvious Over The Prior Art.

a) Introductory Comment.

In the last office action, there were two main grounds of rejection. The first was the British reference 2,111,017 in view of Bean (1,083,182), and the second was also based upon the British reference, used in combination with Schaller (US 4,662,536). Also the Larsen patent (US 3,885,688) was used as a secondary reference to reject claim 6.

Accordingly, the arguments in this appeal will be organized as follows:

- i. There will first be a discussion of the structure of the British reference and how this would have to be reconstructed to meet the limitations of claim 1 as presently amended.

- ii. Then we will examine whether it would be appropriate to combine the teachings of Bean with the British reference to meet the limitations of claim 1.
- iii. Next, we will analyze whether the combination of Schaller with the British reference could be made to meet the limitations of claim 1.
- iv. The Larsen patent (US 3,885,688) will be discussed.
- v. The depending claims 3 – 9 and 13 will be discussed.

b) How the British reference 2,111,017 would have to be modified to meet the limitations of claim 1.

Let us look at the main limitations of claim 1 and make a step-by-step comparison.

- i. First, claim 1 recites a beam structure extending over the object to be lifted (i.e. the manhole cover).

Admittedly, the British reference does show a beam structure.

- ii. Claim 1 recites a pivot support connection located at a pivot end thereof and arranged to support the pivot end at a substantially stationary base surface pivot location.

The only element in the British reference which would possibly correspond to that limitation would be the jack 21 of the British reference. However, this clearly does not function as a pivot member, and there is nothing shown in the British patent that it could possibly function as a pivot member. Further, it should be noted that, on the second page, column 1 of the British patent, beginning on line 56, it is stated that the three blocks 36 are placed near the edge of the cover overlapping the frame surrounding the cover so that there is no risk of the frame, as well as the

cover, being lifted relative to the ground. It can be seen in Fig. 1 that specifically this block 36 is intended to be positioned over the adjacent portion of the pivot frame 11 to prevent any upward movement of the manhole cover 10. This would obviously teach against attempting to make this jack a pivot member.

- iii. There is recited a mobile support connected to the beam structure and having a mobile surface-engaging portion to be moved laterally over the base surface.

The only elements in the British reference which could possibly correspond to this are the two jacks 22 and 23. These are firmly planted on the ground and they also have blocks 36 which are intended to rest over the edge of the frame 11 to hold it down.

- iv. Claim 1 recites a lifting mechanism mounted to the beam structure, between the pivot support and the mobile support and comprising a lift connection to engage the object and an actuator acting through the lift connection to lift the object.

The actuators of the British references are in the jacks.

With this analysis being given, now let's look at the entire reconstruction of the British reference that would be necessary to meet the limitations of claim 1. The function of the jack 21 would be totally eliminated and would suffice simply to have a post extending downwardly as the present invention and acting as a pivot. The two lifting jacks 22 and 23 would be eliminated, and in their place there would be a mobile support portion to be moved laterally. Third, the lifting function (the actuator recited in claim 1) would need to be repositioned to an intermediate portion of the beam.

A careful perusal of every sentence of the British reference gives no indication at all or any suggestion that first any modifications of any sort should be made, and second, that any modifications which would make it



resemble the present invention should be made. In fact, the British reference teaches against it.

- c) Why the combination of the British reference 2,111,017 and the Bean patent (US 1,083,182) do not meet the limitations of claim 1.

There are a number of issues involved here, such as whether the combination should be made in the first place, and even if it should, whether or not it would meet the limitations of claim 1. The various issues will be sorted out under the appropriate headings.

- i. The lack of any teaching (or "link") to make the combination appropriate.

The Bean patent issued some 86 years ago and it essentially shows in Fig. 1-6 a wheeled car jack. In Fig. 7 it shows where an attachment can be added to the top of the car jack so that it can lift another object, such as an engine.

It is evident from the previous discussion of the British patent that there is absolutely no suggestion on teaching in the British patent that it could or should be combined with the teachings of a wheeled lifting device used for moving vehicles from one location to the other. In like manner, there is no suggestion at all in Bean as to why it should be modified from its function of lifting, raising, and moving automobiles or the like, and that it should somehow be converted or combined with apparatus to lift manhole covers.

In the last office action, the Examiner made the rejection of claim 1 (and other claims) on a combination of the British reference and Bean in the following language:

"It would have been obvious to provide the wheels to the plate 36 of the British reference if desiring to transport the cover in view of the

teachings of Bean. Note: Applicant's claims do not preclude the second means from being wheels also."

The question is "why"---why would it have been obvious to provide the wheels of Bean into the British patent, and where is the stationary pivot location? Again, we have to remind ourselves that we can't use the present patent application as a roadmap. Let us assume that we give the British application to a competent person in the U.S. Patent & Trademark Office, and person has nothing before him but the British patent, and we ask him to search far and wide for some teaching as to how the British patent could be improved or modified in some advantageous manner. The odds of this person finding this particular area of search and finding this particular patent (i.e. the Bean patent) and perceiving some way to incorporate this into the British patent publication are infinitesimal.

ii. Non-analogous art.

The Bean reference is in a totally unrelated art. The task of traveling to various locations in a city environment and removing manholes is a rather specialized and, one might say, "isolated" activity. It should be kept in mind that lifting devices are used in possibly every conceivable technology where there are any physical objects, whether this be in construction sites, offshore oil platforms, manufacturing plants, grocery stores, farms, lumber camps, fishing, auto repair shops, etc. About the only thing that these two areas of endeavor (i.e. removing and replacing manhole covers on the one hand, and mobile automobile jacks on the other) have in common is that both somehow produce a vertical lift. That is simply not enough to place them in a common category.

iii. Even if one were to combine the British reference with the Bean reference, there would not be a reconstruction of the invention as recited in claim 1.

In the main embodiment of Bean, shown in Figures 1 – 6, there are two main side wheels which bear substantially the entire load with the apparatus functioning as a jack. These are arranged for back-and-forth movement toward or away from the vehicle. Then there is a single swivel wheel which is used primarily to steer the wheeled jack. If one were literally to take the apparatus of the Bean patent and apply it to the British patent application, one would presumably replace the two jacks 22 and 23 with the two main wheels of Bean, and then make the third jack 21 a swiveled roller. Further, with the actual lifting portion of the Bean car jack being positioned between the two wheels, the two wheels would likely be placed on opposite sides of the manhole cover and aligned with its diameter. And all that would happen is that there would somehow be a lifting action and they would wheel the entire the assembly away, but not about any pivot location.

However, there is even an impediment beyond that. The actuator that does the lifting is intended to be between the mobile and the pivot location. Where is the pivot location in either the British reference or Bean? The benefit of having the stationary pivot location is so that after the manhole cover is moved laterally to its position away from the manhole, it can be simply rotated back to its original position without any repositioning needed. This benefit is not suggested in either the Bean patent or the British patent.

Let's explore this even further and assume that possibly the arrangement of Fig. 7 of Bean might be used. If that were done, then we would have a hoist which is positioned out in front of the apparatus of Bean, and there would not be any beam straddling the manhole cover. Nor would be the pivotal location.

- iv. A reconstruction created between the British patent and the Bean patent would frustrate the operation of the apparatus of these two references.

If the two main support wheels of Bean were moved over to the British patent application, then the two main support wheels would have to be

repositioned by rotating them about a vertical axis 90 degrees so that they would be able to move in a circumferential path about a pivot location. If this were done to the car jack of Bean, then how could it possibly move an automobile forward, rearwardly, etc.? The Bean patent expressly wants a reliable jack to move the vehicle in most any direction! That is exactly opposite to the desired function of the present invention!

We come back to what could possibly be the benefit of having a fixed pivot location in the Bean apparatus. All that would mean is that an automobile could be moved about a single point in a circular arc. That would totally frustrate the operation of the Bean reference.

d) Why Is It A Combination Of The British Reference And The Schaller Patent (US 4,662,526) Would Not Meet The Limitations Of Claim 1?

This raises several issues, and these will be discussed under the appropriate headings.

i. The lack of a linking teaching.

The Schaller patent is directed toward the problem encountered in removing the cover of an electric arc furnace. In reading the section under "Description of the Prior Art", it points out that the gantry arm that extends over the furnace is exposed to a temperature of approximately 400 degrees C which can cause deformation and damage to the hoist mechanism, particularly in the joints. The entire thrust of this patent is to alleviate this problem. In the first sentence under "Summary of the Invention" (column 1, beginning on line 46), the text reads as follows:

"The object of the present invention is, therefore, the provision of a hoist mechanism for a cover for an electric arc furnace which is relatively immune to heat and the effects of electric current."

If one reads through the rest of column 1 and to the top column 2 of this Schaller patent, it will be seen that there is a system described where cooling fluid surrounds the pulling or hoisting rods and the hoisting piston cylinder mechanisms. The gantry arms of the invention and transverse bars are provided with fluid-type connectors for a cooling fluid. Then in column 2, line 7, we find the following sentence:

“The protective pipes will thus operate at a temperature of the coolant and can be kept below a temperature of approximately 50 degrees C without any difficulty. The fact that this temperature may be kept down to this degree is particularly important for the hydraulic hoisting mechanism.”

It happens that in this particular design of Schaller, the entire mechanism has a base 4 with a pivot location 20 and two wheels 21. The only mention that is given to this particular arrangement is a ten-word sentence that appears in column 2, beginning in line 66 as follows:

“The gantry 14 is arranged about support pin 20 on wheels 21.”

That is the total teaching of the Schaller patent that could conceivably be considered relevant to the present invention.

ii. The two references are from non-analogous arts.

It is difficult to imagine two areas of endeavor which are more widely separated (i.e. the task of moving and replacing manhole covers and the task of providing for an electric furnace a hoisting mechanism that is able to withstand extremely high-temperature environments). The problems encountered are totally separate. The main problem attacked by the present invention is providing a user-friendly means of lifting a manhole to alleviate back problems of human beings. The main endeavor of the Schaller patent is to provide a hoist that can withstand the high-temperature environments. If one were looking for ways to

improve the manhole cover-lifting device, would one have any reason to look for a hoist that is particularly designed to withstand high-temperature environments? Certainly not.

- iii. Even if the combination were attempted, the person would not arrive at the configuration of claim 1.

It will be noted that the Schaller patent has a support member 4 with the pivot location 20 and the wheels 21 and that there is an upright post and then a cantilevered frame extending outwardly over the furnace. If one were to take the lifting device of Schaller and move it over to lift a manhole, what would happen is that the entire base and the wheels 20 and 21 would be positioned on one side of the manhole. There is no teaching that the wheels and the pivot should straddle the manhole cover.

e) Discussion of US 3,885,688 (Larsen)

In the previous text, the three prior art references discussed were the British patent, the Bean patent, and the Schaller patent. We turn our attention now to the fourth patent cited, namely the Larsen patent (US 3,885,688). This patent was cited to show the combination of wheels and the pivot in a rejection of claim 6. More specifically, on page 3 of the last office action, paragraph 8, we find the following language:

“It would have been obvious to use the wheels at one end and a pivot at the other end of the beam structure of the British reference in view of the wheels and pivot in Larsen (Fig. 9).”

The fallacy of this was discussed earlier in this appeal brief, but to comment on it at least briefly at this point, the following is provided. As indicated previously, the only thing that could be equated to a pivot in Fig. 9 is the member 47. However, it is not a single pivot, but rather, a pair of members which move

down to a ground location and provide support. Since there are two laterally spaced members engaging the ground, there can't be a pivot action.

Nevertheless, let's assume that it is a pivot member. How could there be a pivot motion, since the wheels 17 are aligned in a forward-to-rear direction? The only way the apparatus could be pivoted about the alleged pivot member 47 is to skid the wheels 17 sideways, or lift the wheels 17 totally off the ground in some sort of a pivot action.

Therefore, with all due respect to the Examiner's position in the last office action, it is submitted that the Larsen reference is improperly applied.

With the foregoing being given, let's now discuss each of the depending claims.

f) Why the Depending Claims 3 – 9 and 13 Distinguish Over the Prior Art.

i. Claim 3.

It should be noted that claim 3 was not amended in the preliminary amendment to be made to depend upon claim 1, since claim 2 was cancelled in the preliminary amendment. For purposed of this appeal, it should be assumed that this will be accomplished at such time as the application is returned to the Examiner for further action.

This has the additional limitation that the surface-engaging portion moves in an arcuate path. This is, of course, the simplest and most desirable arrangement, and it offers the advantage that the assembly will move in the same path away from the manhole location and back over the manhole location.

ii. Claim 4.

This has the further limitation of having a pair of surface-engaging wheels on opposite sides of the mobile end of the beam structure. This adds stability to the assembly and further simplifies the tasks of the workman.

iii. Claim 5.

This claim depend upon claim 4 and indicates that the two wheels have an axis of rotation where the two axes converge to meet at the location of the pivot support. This distinguishes over the use of casters which rotate in most any direction, and this arrangement of the wheels again adds more stability to the arcuate path traveled so that the removal and replacement can be handled more expeditiously.

iv. Claim 6.

It should be noted that this is erroneously recited to depend upon claim 2. At such time as the application is returned to the Examiner for further action, this will be amended to make the dependency on claim 1.

This relates to the post extending downwardly from the pivot end to engage the base surface. This provides a rather simple and yet effective pivot location for the assembly.

v. Claim 7.

This depends upon claim 1 and adds that the lifting mechanism is a lifting jack mounted to the beam structure at an intermediate location of the beam structure. This provides a simple arrangement and also makes the apparatus "user-friendly". Further, it clearly distinguishes from all of the references cited. More specifically, recited as follows:

- The British patent application has several lifting mechanisms, and these are spaced at opposite ends of the beam.



- In the Bean reference, in the main arrangement, the lifting member is between the two main wheels and is not between any pivot location and a mobile end which is constrained to move in a circumferential path.
- The Schaller patent shows the lifting mechanism which is not positioned on a structural member extending between a pivot location and the wheel support location.
- The Larsen patent does not show a pivot location, and if it did, it would not be on the beam structure between a pivot location and a mobile location so that the manhole cover remains aligned.

vi. Claim 8.

This depends upon claim 7 and adds a further limitation that the jack has a substantially vertical lift axis. This enhances the ability to properly raise the manhole cover and also lower it into a precise location.

vii. Claim 9.

This depends upon claim 8 and recites specifically the screw jack? It should be kept in mind that the apparatus should be "user-friendly" and also place little stress on the person who is utilizing the assembly of the present invention. As indicated in the prior remarks in this appeal brief, with a rotary force of 4 to 11 pounds, the lifting force of 900 pounds could be accomplished.

viii. Claim 13.

This recites that the object being lifted is a manhole cover and that the base surface is a paved ground surface adjacent to the manhole cover. This places the present invention clearly in this particular environment.

9. Skill Level Of Those In The Arts.

We now look at the issue of whether the differences between the present invention and the prior art are unobvious to “one of ordinary skill in the art to which the invention pertains”. This issue warrants some careful analysis. As indicated earlier in this text, the problem toward which the present invention is directed is that workmen in the utility industries having back injuries from removing and replacing manhole covers (vault lids) has been with us for 90 years. The problem is still there. Why? In every work environment where there is susceptibility to injury, there are safety manuals, safety programs, evaluations by OSHA representatives providing a safe work environment, etc.

To speculate further on this issue, in a more controlled environment, such as being in a factory where there are the same walkways, the same machines, etc., then it is a simpler matter to carefully examine the workplace and identify various items that could be dangerous. The day-to-day working environment can more easily be observed by supervisory personnel or safety personnel to ensure the proper safety measures are utilized.

However, in an industry where people travel from place to place and have a schedule they must keep, they are pretty much on their own and we have a somewhat different situation. There can be group instructions given on how to lift, and guidelines published, and this is of course being done in the various utility industries. Yet the back problems have persisted for many decades.

To put the present invention together, one should have insights into at least the following factors:

- i. An understanding of the capabilities and limitations of the human body (not just a superficial understanding, and not just an abstract academic understanding, but who can also relate this to a practical working environment).

- ii. An understanding of the actual day-to-day operations of the people who work with utility vaults and vault covers, and what can reasonably be accepted by these people.
- iii. The design skills to match these requirements and come up with an apparatus and method that satisfies the diverse requirements.

In coming up with the present invention, the inventors concluded that there is nothing available in the prior art to meet all these requirements. Therefore, they had to perform sufficient analysis, study, and experimentation to find the following:

- i. create an apparatus which involves physical movements by the workmen which are of such a nature that these would minimize the risk of back injuries;
- ii. build an apparatus where these physical movements could be performed and yet accomplish the lifting action with sufficient force, and also the application of lateral forces to get the basic job done (i.e. lifting the manhole cover, moving it laterally, and then moving it back to its original position) without creating undesired strain on the person's back;
- iii. making sure that the operation of the machine is sufficiently user-friendly and effective so that the workmen would want to use it;
- iv. meet the other requirements of being practical in the working environment in which these people operate; and
- v. make it cost-effective (being able to get the job done effectively within a sufficiently short time period).

Mr. Davis, one of the co-inventors, had sufficient insight into many of these requirements so that he recognized that possibly there is a basic problem that in the present environment, no matter how many safety courses you give,

this has not (and likely will not) make a significant reduction in the occurrence of back injuries. This led him to study the basic movements that would be possible and how these might be employed in developing an apparatus which simply did not presently exist in the prior art. Mr. Neeley, the other co-inventor, cooperated with Mr. Davis to work on designs that would meet these criteria and would have sufficient simplicity, and yet "do the job". Then there has to be cranked into this equation the intangibles of what will be acceptable to the workmen who are on a schedule to get their job done within an allotted time. Over the many decades, the other attempts at mechanizing this task have apparently not been accepted to any great extent. It was necessary to look at the human obstacles and solve these also.

Then, after the basic design was conceived by Mr. Neeley and Mr. Davis, it must be tried out, streamlined, and optimized to develop an overall acceptable solution.

With all that being presented, how does this relate to identifying that "imaginary" person who we must create intellectually as "one of ordinary skill in this art"?

In reviewing the patent literature relating to the removal and replacement of manhole covers, it is submitted that one would have to conclude that the skills required to solve this problem are "fragmented". To put this another way, there are several different parts of the puzzle, and different people looked at different parts. For example, in the prior art there are a number of manhole-lifting devices that appear in the prior art (these being listed in the prior art statement) and to the best of the applicants' knowledge, none of these have obtained wide commercial acceptance. While these might have quality design features in terms of mechanical movements, in the overall picture they are lacking.

Therefore, we would have to conclude while there may be some quite intelligent people who have looked at this problem and attempted a solution, in terms of results, the overall the skill level in this art is at a very low level.

As evidence of this, let's look again at the British patent application 2,111,017. The inventor obviously has mechanical skills, and as an abstract

mechanical problem of lifting an object that is stuck in the ground, it may be well designed. But, it is evident from the analysis given prior in this text as to its complexity of operation, it is lacking in a large segment of the human factors and practicality in the actual working environment. The most significant one is that after the apparatus in the British reference lifts the manhole cover off the ground, then what happens? How do you move it sideways? Further, prior in this text, the large number of steps that must be performed in operating it are given. Why take all this time? In the present invention, only one jack is operated in a simple manner to accomplish lifting operation in a very short period (less than a minute). With all due respect to the several patentees who have made efforts to solve these problems, and with all due respect to the talents they might have, in terms of having background in the various segments of understanding that a person must have to attack this problem, the state of the art is sadly lacking.

Thus, what is the "bottom line"? This process of removing and replacing manhole covers is a rather isolated area of study, and very little expertise has been developed in this area.

#### 14. Summary

- a) In Section 1.192 of the rules discussing the appellant's brief, it is stated that:  
"If the rejection is based on a combination of references, the argument shall explain why the references, taken as a whole, do not suggest the claim's subject matter..."

There are four references cited to reject the application. In the real world, if someone were to find and one of these references, either in the Patent Office or in some real world environment, it is highly unlikely that the person would ever seek to come across the other reference which is in a rather unrelated field. It is elementary in patent law that when two references are combined, there must be

a suggestion in one or the other that such a substitution should be made, or there should be some linking reference bridging the gap. This is totally lacking in this rejection.

It is believed the main issues are as follows:


- a) The problem solved by the present invention has been with us for at least 90 years, and it is a serious problem. The present invention is able to meet the criteria to solve this problem.
- b) The skill level of people who are in this art (i.e. devising a practical, user-friendly mechanism for removing and replacing manhole covers) hardly even exists. It is not because the people who have made attempts in this are not intelligent. Rather, to come to a successful design, there are various pieces of the puzzle which must be put together, and it's even questionable whether such people now exist (except possibly for the co-inventors who have begun with some basic skills and have filled the gaps in going up their learning curve in creating the present invention).
- c) The primary reference relied upon by the Examiner in rejecting the present application (UK Application 2,111,917) is not only very far from meeting the limitations of claim 1, but also is an example of an inadequate approach to resolving the problem. There are a number of other patents in this prior art which deal with the lifting of manhole covers, but while these are mechanically openable, they are still lacking in being a practical commercial embodiment.
- d) The four references that were cited by the Examiner and combined to come up with rejections, are all from non-analogous art. Beyond that, there is no linking reference to suggest why there would be any reason for combining any of these.

- e) The benefits derived by the present invention are substantial. It is not evident that these could be achieved by the prior art. In the present invention, the lifting of the manhole cover is accomplished in less than a minute, the lateral movement is a very simply pulling movement and places hardly strain on the person's back. The return of the manhole cover back to its original position is just as simple. The apparatus itself is small, easy to handle, and thus convenient to the workmen. And, most important, the stress on the person's back is substantially non-existent. There is a 4- to 11-pound force exerted by raising the manhole cover. The person simply needs to roll the manhole cover laterally on rollers, and this can be done in an upright position. These benefits simply do not exist in the prior art or combination of these prior art references.

Respectfully submitted,

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## IX. APPENDIX

### Copy of the Claims Involved in The Appeal

1. A lifting assembly arranged to lift an object which has a width dimension and is at least partially surrounded by a base surface which has a substantial horizontal alignment component, such as a manhole cover surrounded by a paved or ground surface, said assembly comprising:
  - a) a base support assembly comprising:
    - i. a beam structure which has a lengthwise axis, is adapted to be positioned above the object, and has a length dimension greater than the width dimension of the object, said beam structure having a first pivot end and a second mobile end spaced from one another a sufficient distance so that the beam structure can be placed over the object to be lifted, with the first and second ends engaging the base surface in load bearing relationship on opposite sides of the object to be lifted, said beam structure being the primary load carrying structure relative to the object to be lifted;
    - ii. a pivot support connect to the beam structure and located at the pivot end thereof, and arranged to support the pivot end of the beam structure from the base surface at a substantially stationary base surface pivot location on one side of the object to be lifted during movement of the lifting assembly;
    - iii. a mobile support connected to the beam structure and located at the mobile end thereof, and arranged to support the mobile end of the beam structure from the base surface on an opposite side of the object to be lifted, said mobile support having a mobile base surface engaging portion to enable the mobile support to be moved laterally over the base surface;



- b) a lifting mechanism mounted to the beam structure between the pivot support and the mobile support and comprising a lift connection to engage said object and an actuator acting through said lift connection to lift said object

whereby said lifting assembly can be positioned over said object with the pivot support being on one side of said object and the mobile support being on an opposite side of said object, so that said lifting mechanism is able to raise said object, and the mobile support of said lifting assembly can be moved laterally so as to move said object about said pivot support.

3. The assembly as recited in claim 1, wherein the surface-engaging portion of the mobile support is arranged to move in an arcuate path having said stationary location of the pivot support being at a center of said arcuate path.
4. The assembly as recited in claim 3, wherein said surface-engaging portion comprises a pair of base surface-engaging wheels spaced on opposite sides of the mobile end of the beam structure.
5. The assembly as recited in claim 4, wherein each of said wheels has an axis of rotation, with the two axes of rotation converging and meeting at substantially said location of the pivot support.
6. The assembly as recited in claim 1, wherein said pivot support comprises a post extending downwardly from the pivot end of the beam structure, with a lower end of the post being adapted to engage the base surface.
7. The assembly as recited in claim 1, wherein said lifting mechanism comprises a lifting jack mounted to said beam structure at an intermediate location between the pivot end and the mobile end of the beam structure.
8. The assembly as recited in claim 7, wherein said jack has a substantially vertical lift axis, and said jack has a lifting member connecting at a lower end thereof to said lift connection, said jack having said actuating means to raise said lifting member relative to said beam structure.

9. The assembly as recited in claim 8, wherein said jack is a screw jack, comprising an actuating screw vertically aligned in said jack, and further comprising manually operable crank means to turn said actuating screw.
13. The assembly as recited in claim 1, wherein said object is a manhole cover, and said base surface is a paved or ground surface adjacent to said manhole cover.